

North Carolina Geological Survey

Information Circular 36

Natural Gas and Oil in North Carolina



INTRODUCTION

Though natural gas and oil are known to occur in North Carolina, they are not currently produced in the state. Additional work is needed to evaluate their economic value. This report provides an overview of natural gas and oil potential in North Carolina, how natural gas and oil forms, recent interest in both on-shore and off-shore resources, and a summary of the current permit requirements and regulations. North Carolina currently does not produce any natural gas or oil.

Natural gas and petroleum are made up of many hydrocarbon compounds. The simpler hydrocarbons are gases because of their relatively lower molecular weight. The more complex ones are in liquid or solid form.

The first commercial oil well in the United States was drilled in 1859 at Titusville, Pa. Oil was struck at a depth of 69 feet and the well was capable of producing approximately 25 barrels of oil per day.

Between 1925 and 1998, 128 petroleum exploration holes have been drilled in North Carolina. None were commercial. Recent exploration has been focused in Lee and Chatham counties. Two of these exploration wells remain under permit in Lee County but are not in production.

GEOLOGY

The four requirements to produce natural gas and oil are: 1) source rocks to generate the resource, 2) heat/pressure to mature the resource and its migration, 3) porosity / permeability for movement of the resource, and 4) traps to hold the resource.

GENERATION OF NATURAL GAS AND OIL

The processes to produce and concentrate hydrocarbon resources are complex and take a long time. Petroleum formation requires that sedimentary deposits containing organic debris be buried at sufficient depths so that they are “cooked” by the Earth’s natural heat over time. With progressively deeper burial, the organic remains are converted to a substance called kerogen. The kerogen, in turn, is converted to natural gas and oil as depths of burial and corresponding temperatures and pressures increase.

The best preservation of organic material occurs in fine-grained sediments that accumulated at the Earth’s surface under reducing conditions (an environment where the amount of oxygen is low). Dark-gray and black shales accumulated under reducing conditions generally contain an abundance of organic matter and have long been recognized by petroleum geologists as potential petroleum source beds. Some carbonate rock strata have proved to be more than adequate sources of natural gas and oil.